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IN THE CLAIMS:

1 - 10. (Cancelled)

11. (Original) A process for operating an electrochemical system, comprising:
calibrating a hydrogen gas detector by
passing a hydrogen-free gas through a first conduit to the hydrogen detector,
wherein the hydrogen gas detector generates a first signal;
flowing a known quantity of hydrogen gas from a hydrogen/water separator
through a second conduit to the hydrogen gas detector, wherein the hydrogen gas detector
generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and
calibrating the hydrogen gas detector based upon the first and second signals;
introducing water to an electrolysis cell;
producing hydrogen;
separating hydrogen from water in the hydrogen/water separator;
introducing environmental gas disposed around electrochemical system components to
the hydrogen gas detector; and
determining the hydrogen concentration in the environmental gas.

12. (Original) The process according to Claim 11, wherein the calibration of the
hydrogen gas detector further comprises mixing the hydrogen gas with hydrogen-free gas prior to
introduction to the hydrogen gas detector, and wherein the mixture of the hydrogen gas and the
hydrogen-free gas has a known hydrogen concentration.

13. (Original) The process according to Claim 11, further comprising introducing
hydrogen and oxygen to a fuel cell stack and generating electricity.

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14. (Original) The process according to Claim 11, wherein calibrating the hydrogen gas detector further comprises generating additional signals, wherein each one of the additional signals corresponds to a different percentage of the hydrogen gas, and calibrating the hydrogen gas detector with the additional signals.

15. (Original) The process according to Claim 11, wherein the hydrogen gas and the hydrogen-free gas are at about ambient pressure.

16. (Original) The process according to Claim 11, purging the electrochemical system if the hydrogen gas concentration exceeds a selected amount.

17 – 20. (Cancelled)

21. (Previously Presented) A process for operating an electrochemical system, comprising:

calibrating a hydrogen gas detector by

passing a hydrogen-free gas to the hydrogen detector, wherein the hydrogen gas detector generates a first signal;

flowing a known quantity of hydrogen gas to the hydrogen gas detector, wherein the hydrogen gas detector generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and

calibrating the hydrogen gas detector based upon the first and second signals;

introducing water to an electrolysis cell;

producing hydrogen;

separating hydrogen from water in the hydrogen/water separator;

introducing environmental gas disposed around electrochemical system components to the hydrogen gas detector; and

determining the hydrogen concentration in the environmental gas.

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22. (Previously Presented) The process according to Claim 21, wherein the calibration of the hydrogen gas detector further comprises mixing the hydrogen gas with hydrogen-free gas prior to introduction to the hydrogen gas detector, and wherein the mixture of the hydrogen gas and the hydrogen-free gas has a known hydrogen concentration.

23. (Previously Presented) The process according to Claim 21, further comprising introducing hydrogen and oxygen to a fuel cell stack and generating electricity.

24. (Previously Presented) The process according to Claim 21, wherein the hydrogen gas and the hydrogen-free gas are at about ambient pressure.

25. (Previously Presented) The process according to Claim 21, further comprising recalibrating the hydrogen detector.

26. (New) The process according to Claim 21, further comprising periodically calibrating the hydrogen gas detector.

27. (New) The process according to Claim 1, further comprising periodically calibrating the hydrogen gas detector.

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28. (New) A process for operating an electrochemical system, comprising:
calibrating a hydrogen gas detector by

passing a hydrogen-free gas through a first conduit to the hydrogen detector,
wherein the hydrogen gas detector generates a first signal;

flowing a known quantity of hydrogen gas from a hydrogen/water separator
through a second conduit to the hydrogen gas detector, wherein the hydrogen gas detector
generates a second signal corresponding to a percentage of the hydrogen gas in the mixture; and

calibrating the hydrogen gas detector based upon the first and second signals by
mixing the hydrogen gas with hydrogen-free gas prior to introduction to the hydrogen gas
detector, wherein the mixture of the hydrogen gas and the hydrogen-free gas has a known
hydrogen concentration;

introducing water to an electrolysis cell;

producing hydrogen;

separating hydrogen from water in the hydrogen/water separator;

introducing environmental gas disposed around electrochemical system components to
the hydrogen gas detector;

determining the hydrogen concentration in the environmental gas;

purging the electrochemical system if the hydrogen gas concentration exceeds a selected
amount; and

introducing hydrogen and oxygen to a fuel cell stack and generating electricity.

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29. (New) A process for operating an electrochemical system, comprising:
calibrating a hydrogen gas detector by
passing air to the hydrogen detector, wherein the hydrogen gas detector generates
a first signal;
flowing a known quantity of hydrogen gas from a hydrogen/water separator to the
hydrogen gas detector, wherein the hydrogen gas detector generates a second signal
corresponding to a percentage of the hydrogen gas in the mixture; and
calibrating the hydrogen gas detector based upon the first and second signals;
introducing water to an electrolysis cell;
producing hydrogen;
separating hydrogen from water in the hydrogen/water separator;
introducing environmental gas disposed around electrochemical system components to
the hydrogen gas detector; and
determining the hydrogen concentration in the environmental gas.